Gasoline & diesel engines, EV & HEV motors

Handheld Digital Tachometer

HT-6200

External sensor input type

http://www.onosokki.co.jp/
Handheld Digital Tachometer

HT-6200

Advanced model of the HT-6100
Not just measuring gasoline/diesel engine rotation but motor rotation of EV/HEV!

All in one model for measuring gasoline/diesel engines and EV/HEV motors!
Three types of output (analog, pulse and monitor) for recording and tracking analysis of rotation.

Features

1. Can be used with various sensors
Various types of rotation sensors can be connected. Rotation measurement of gasoline engines, diesel engines and motors can be performed in one tachometer.

2. Three outputs provided as standard
- Analog output: For recording of rotation speed
- Pulse output: For synchronous signal with rotation
- Monitor output: For checking a detected signal

3. Built-in peak-hold function
Max. and Min. values can be displayed during measurement.

4. Built-in memory function
Up to 20 data can be stored.

Specification

<table>
<thead>
<tr>
<th>Object to be measured</th>
<th>Engines, motors and general rotating objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>5-digit LCD with backlight (character height: 10.2 mm)</td>
</tr>
<tr>
<td>Calculation method</td>
<td>Periodic operation method</td>
</tr>
<tr>
<td>Measurement time</td>
<td>1 s ±1 period</td>
</tr>
<tr>
<td>Measurement accuracy</td>
<td>Displayed value x (±0.02%) ± count</td>
</tr>
<tr>
<td></td>
<td>* The displayed value is the count value excluding figures after the decimal point. The measurement accuracy of the line speed depends on the accuracy of rotation speed (r/min).</td>
</tr>
<tr>
<td>Setup range of number of pulses (P/R)</td>
<td>0.50 to 200.00 (engine rotation measurement)</td>
</tr>
<tr>
<td></td>
<td>0.50 to 999.99 (other than engine rotation measurement)</td>
</tr>
<tr>
<td>Peak-hold function</td>
<td>Maximum value (MAX), Minimum value (MIN)</td>
</tr>
<tr>
<td>Memory function</td>
<td>Up to 20 data</td>
</tr>
<tr>
<td>Over-range function</td>
<td>The over-range warning (ERROR mark) is displayed when the measured value exceeds the display range.</td>
</tr>
<tr>
<td>Rotation upper limit warning function</td>
<td>The upper limit warning (↑ mark) is displayed when the rotation speed exceeds the preset upper limit value.</td>
</tr>
<tr>
<td>Line speed calculation function</td>
<td>Calculates the line speed from the preset diameter value (mm) and the measured rotation speed.</td>
</tr>
<tr>
<td>Accumulating function</td>
<td>Count accumulated pulses of input signal</td>
</tr>
<tr>
<td>Measurement function</td>
<td>Measures the input pulse period (1 second or less; average value of input pulses)</td>
</tr>
<tr>
<td>Trigger level adjustment function</td>
<td>Trigger level can be adjusted using a rotary dial at the right-hand side of the main unit.</td>
</tr>
<tr>
<td>Connector</td>
<td>φ2.5 mini-mini jack</td>
</tr>
<tr>
<td>Analog output content</td>
<td>Output to the display value of rotation speed</td>
</tr>
<tr>
<td>Output voltage</td>
<td>0 to 1 V/O to F.S. (F.S. can be specified.)</td>
</tr>
</tbody>
</table>

Conversion method: 10-bit D/A conversion method
Linearity: ±1.0 % / F.S.
Output update time: 50 ms × Input signal one-period time or less
Temperature stability: ±0.05 % / F.S./°C (ZERO & SPAN)
Setting error: ±0.5 % / F.S.
Load resistance: 100 kΩ or more
Output voltage: Hi level: +4.5 V or more
Lo level: +0.5 V or less
Output logic: Positive logic pulse
Load resistance: 100 kΩ or more
Continuous operating time: 16 hours or more (backlight OFF)
8 hours or more (backlight ON)
"When alkaline batteries are used at 21 °C." Battery LOW display: Lights up at about 4.5 V ("LOW" will be displayed.)
Operating temperature range: 0 to +40°C
Storage temperature range: −10 to +50°C

Accessory: Type AAA battery x 4, carrying case x 1, Instruction manual x 1
### Measuring rotation of gasoline engines

#### Attachment method

The rotation of gasoline engines can be measured using the IP-3000A (Ignition pulse detector) and the HT-6200 (Handheld digital tachometer). The IP-3000A is attached on a spark plug wire.

#### Tracking analysis of noise & vibration

The pulse output signal from the HT-6200 can be used for tracking analysis. By measuring noise & vibration data and pulse signal from the HT-6200 simultaneously with the FFT Analyzer, the order-ratio analysis can be performed.

### Measuring rotation of diesel engines

Rotation of diesel engines can be measured by using the HT-6200 and the VP-1220 (rotation vibration sensor). The HT-6200 measures engine rotation using the engine vibration detected by the VP-1220. (The rotation of an engine with 6 or more cylinders may not be measured.)

### Applications

#### Measuring motor rotation of EV/HEV

#### Attachment method

The OM-1200 (ignition pulse detector) detects the magnetic flux leakage from a motor and enables rotation measurement of EV/HEV. Just attach the sensor on the side of the motor to measure the rotation. Any processing such as hole drilling is required. The OM-1200 is installed perpendicularly to the rotating shaft of the motor. It needs to set the number of poles (number of pulses P/R) for HT-6200.

#### Actual running test of HEV

The above graph shows the rotation speed of a motor and an engine in HEV (measured by two HT-6200), and the speed of HEV (measured by the LC-8100 GPS speedometer).

### Specifications

#### Measurement range

- **Gasoline engine**
  - Ignition pulse detector: IP-296/292/3100/3000A
  - Motor/gasoline engine RPM detector: OM-1200
  - Engine vibration detector: VP-1220

- **Diesel engine**
  - Ignition pulse detector: IP-296/292/3100/3000A
  - Motor/gasoline engine RPM detector: OM-1200
  - Engine vibration detector: VP-1220

- **Motor (EV, HEV)**
  - Motor/gasoline engine RPM detector: OM-1200

- **General rotating object**
  - Electromagnetic rotation detector MP-900/9000 series

#### Measurement units

- **Gasoline engine**
  - r/min (rotation speed)
  - n/min (speed)
  - ms (period)

- **Diesel engine**
  - r/min
  - n/min (speed)
  - ms (period)

- **Motor (EV, HEV)**
  - r/min (rotation speed)

- **General rotating object**
  - r/min

#### Maximum measurement value

- **Gasoline engine**
  - 20,000 r/min
  - The maximum rotation speed is 20,000 r/min regardless of the number of pulses per one rotation (P/R).

- **Diesel engine**
  - 9999.9 r/min (P/R=1), 9999.9 r/min (P/R=1)

- **Motor (EV, HEV)**
  - 9999.9 r/min (diameter = 100 mm), 300 (ms), 99999 (COUNT)

The maximum value varies depending on the number of pulses per one rotation.

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*The measurement range may be changed depending on measurement objects.

*The measurement range may be changed depending on the sensor installation position or type of motor when the motor rotation is measured using the OM-1200.

*The measurement may not be performed normally depending on type of a motor, type of an engine or other reason. Please contact your nearest distributor for more details.
The FT-7200 is a Handheld type Tachometer which measures the rotation speed by performing frequency analysis using FFT calculation. This tachometer is useful for measurement of sensor signal with noise or small amplitude.

- Pulses are missed when the signal amplitude is not constant.
- Malfunctions caused by noise
- Measurement is not possible with low signal amplitude.

**For stable measurement**

**High precision type FT-7200 Advanced Tachometer**

**Main unit**

- HT-6200 Handheld Digital Tachometer

**Sensor (sold separately)**

- VP-1220 Engine vibration detector
- IP-292 Ignition pulse detector
- IP-296 Ignition pulse detector
- IP-3000A Ignition pulse detector
- IP-3100 Ignition pulse detector
- OM-1200 Motor/gasoline engine RPM detector

**Accessory (sold separately)**

- AX-501 Signal output cable
  (for analog and pulse output)
  2.5 φ mini-mini plug ~ CO2 (BNC) 2 m
- MX series Cable for electromagnetic rotation detector
  (for OM-1200, MP series)
  - MX-005 5m
  - MX-010 10m
- OM-0102 Mounting fixture for OM-1200
  (with 3 of adhesive sheet)
- PB-7090 AC adapter
  Input: AC100 to 240V
  Output: DC 5.9V/3.5A
  (AC adapter for AC100 to 120 V: Provided as standard)

**Option**

- For measuring EV/HEV motor rotation
  OM-1200 (sensor)
  OM-0102 (mounting fixture)
- Motor/gasoline engine RPM detector
  OM-1200
- Electromagnetic rotation detector
  MP series
- Ignition pulse detector (primary side)
  IP-292
- Ignition pulse detector (secondary side)
  IP-296
- Ignition pulse detector
  IP-3000A
- Ignition pulse detector
  IP-3100
- Engine vibration detector
  VP-1220
- AC adapter
  PB-7090

**For measuring EV/HEV motor rotation**

- OM-1200 (sensor)
- OM-0102 (mounting fixture)

**Sensor with a mounting fixture**

**Motor/gasoline engine RPM detector OM-1200**

**Electromagnetic rotation detector MP series**

**Ignition pulse detector (primary side) IP-292**

**Ignition pulse detector (secondary side) IP-296**

**Ignition pulse detector IP-3000A**

**Ignition pulse detector IP-3100**

**Engine vibration detector VP-1220**

**AC adapter PB-7090**

**Sensor with a mounting fixture**

- OM-1200 (sensor)
- OM-0102 (mounting fixture)

- Motor/gasoline engine RPM detector OM-1200
- Electromagnetic rotation detector MP series
- Ignition pulse detector (primary side) IP-292
- Ignition pulse detector (secondary side) IP-296
- Ignition pulse detector IP-3000A
- Ignition pulse detector IP-3100
- Engine vibration detector VP-1220
- AC adapter PB-7090

**For stable measurement**

**High precision type FT-7200 Advanced Tachometer**

**Measurement example**

- Accelerometer
- Frame etc.
- M-3117 Microphone preamplifier
- M-3433 2 inch Microphone
- FT-7200
- FT-0801 Cigarette light socket sensor

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